

# Homebrew Galena Crystal Set

## Enjoying a 1920's radio experience

Ever since my youth, I have been attracted to crystal radios I had seen pictured in old books. There is a special appeal about a device, however primitive, that can pull in radio voices and music through the air from many miles away without batteries or electrical power of any kind, just an antenna and a ground.



That explains my immediate attraction to this little homebrew crystal radio with galena detector found at a swap meet. It was built into a deep cigar box using a heavy paper roll as a coil form. The coil form measures 4 1/4 inches long with 3 3/4 inches outside diameter. The coil itself consists of 99 turns of solid double-cotton covered wire tapped every 9 turns. Those taps are fed to ten smooth-head screws that make up the tap selector switch contacts.



### Repairs

As with all older electronics, the first repair is a good cleaning, making sure the solder joints are in good shape, and applying a bit of deoxit to all moving electrical contacts, in this case the ten-position tap switch and the crystal holder.

The top of the cigar box had been removed and apparently lost over the years. The cover had been fastened with a small nail which was still on the box. I made a top cover from another old cigar box lid.

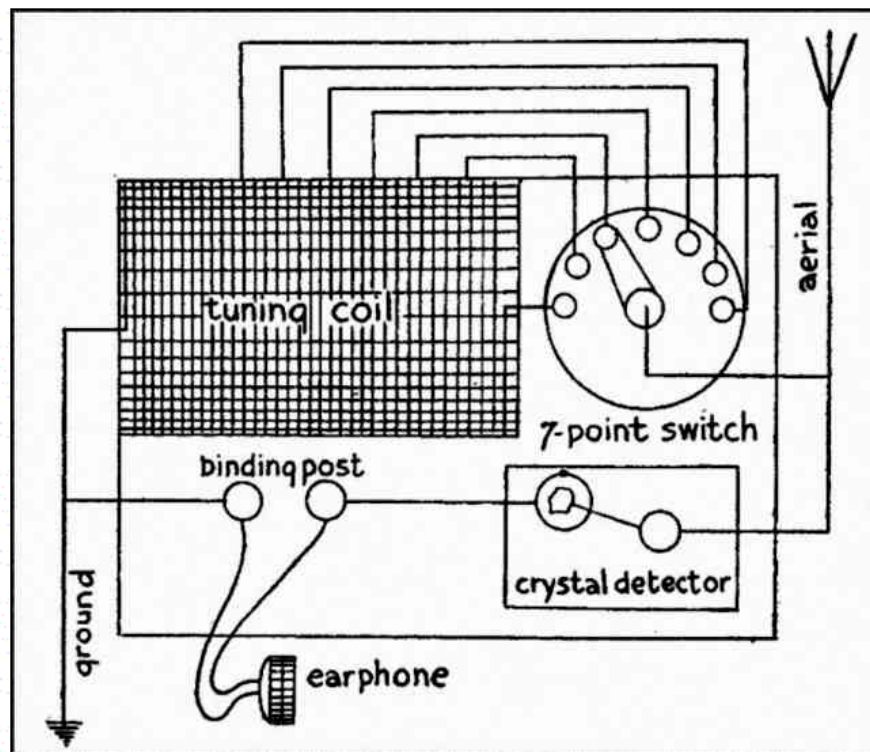
The galena crystal was potted in Wood's metal that had separated into two pieces. Quick work with a soldering iron solved that problem. I cleaned the galena surface with rubbing alcohol as recommended in older articles. I then measured forward and back resistance ratios of the galena-and-cats-whisker diode. While there is a significant difference between forward and back resistance readings on an ohmmeter, the ratio was nowhere close to that of a modern germanium diode, thus limiting the efficiency of the crystal.

### A 1920s experience

I hooked up the set to my 80 meter dipole antenna and listened to the two local AM stations with adequate volume using my equally old but very efficient Baldwin headphones. I could find sweet spots with the "cat's whisker" on the galena crystal that worked reasonably well. However, connecting a 1N34A germanium diode in series with the headphone lead to the galena crystal made a major difference. I could see why the introduction of fixed germanium diodes quickly ended the era of the galena and cat's whisker detector.

### Crystal set schematic showing similar set with 7 position switch and coil taps

(Source: [The Radio Amateur's Hand Book by A. Frederick Collins, 1923](#))



The ten-position tap switch enabled good separation in tuning of the two local stations which are 370 KHz apart. At night I was able to also comfortably listen to some distant stations with strong signals. I also tried a very long wire antenna but found the volume to be about the same as with the 80 meter dipole. Living the experience of a 1920s listener was the fun part. My hat is off in tribute to the quality work of the unknown builder of this very nice little set.

### Information sources

The internet has lots of good sources on building crystal radios with modern parts. Here are a few:

["Build A Crystal Radio"](#) from [The Stay Tuned Website](#)

["Simple Crystal Radio"](#) from [techlib.com](#)

["Building a crystal radio out of household items"](#) from [scitoys](#)

["Quaker Oat Box Radio Project"](#) from [The Xtal Set Society](#)

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An [Altec Lansing A-324A Amplifier](#) was the previous item on the bench.

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